

NOTES ON SOME AUSTRALIAN SHARKS.

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(Plates XXVII-XXIX; Text-figures 1-4.)

The study of sharks is of considerable interest and importance from many points of view. To most persons sharks are noteworthy on account of their size, ferocity, and the fact that they attack human beings from time to time¹. No practical scheme for combating the shark menace has yet been evolved. Nets and fences enclosing small bathing areas are best, but hooters and alarms given from a lookout on a tower, or, more recently, coloured lights fired from aeroplanes, are the usual form of warning in open waters.

The biologist sees in the sharks a group of animals quite distinct from ordinary fishes and occupying a unique position in the vertebrate series. Their general physiology and their breeding habits, ranging from oviparous to viviparous, and the development in some forms of a structure foreshadowing the placenta of higher animals, are of the highest interest. Their relationships with fossils, and the general antiquity of the group allow the palæontologist to visualise the original appearance of the remains of long extinct fossil species.

The bibliographer or historian will find many quaint legends and descriptions of sharks in old books of travel, natural histories, and other literature.

Sharks are of considerable commercial value both as food and for their by-products so that any attempt to clarify the study of them may have a potential economic importance². They are usually caught by means of special nets or lines, but I have seen them experimentally killed by electrocution, a method which may be more extensively employed in the future.

The notes given in this paper are mainly in the nature of preliminary descriptions with figures of some Australian species. In the last twelve years I have studied many specimens both in the Museums of Australia and New Zealand, and in the field. I have corresponded widely with colleagues and card-indexed a large amount of literature. At some future time, I hope to prepare a "Shark Book" which will form a popular guide to all the Australian species, with a figure of each, for the use of the general public.

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¹ See Coppleston, "Shark Attacks in Australian Waters," in *Medical Journal of Australia*, April 15, 1933, pp. 449-467, illustr.

² A sample of tanned shark skin was presented to the Australian Museum by a Mr. Horatio Tozer so long ago as 1858. A description of the latest methods of tanning is given by F. A. Coombs in "The Australasian Leather Trades Review," July 1928, pp. 13-19, illustr.

Family *HEPTRANCHIIDÆ*.Genus *NOTORYNCHUS* Ayres, 1855.**NOTORYNCHUS CEPEDIANUS** (Péron).

Squalus cepedianus Péron, Voy. Austr. i, 1807, p. 337 and Voy. Terres Austr. ed. 2, ii, 1824, p. 218. Adventure Bay, Tasmania (Baudin's expedition).

Notorynchus macdonaldi Whitley, Rec. Austr. Mus. xviii, June 29, 1931, p. 138, pl. xx, figs. 3-5. Manly, New South Wales. Type in Australian Museum.

I find that Péron named the south-eastern Australian Seven-gilled Shark *Squalus cepedianus*, so his name, published in 1807, and hitherto overlooked, must take precedence over my *macdonaldi*. It is also earlier than *Squalus platycephalus* Tenore 1810, which is generally regarded as the first-named seven-gilled shark referable to the genus *Notorynchus*. Though Péron gave sufficient characters for the recognition of his *Squalus cepedianus*, the same cannot be said of *S. rhinophanes*, which he named at the same time, and which I am unable to identify. Perhaps drawings of these Tasmanian sharks still exist amongst the Péron and Lesueur relics in the Havre Museum.

The seven-gilled shark is not uncommon around the North Island of New Zealand, and there is a skin, 9½ feet long, from Oriental Bay, in the Dominion Museum, Wellington. Mr. Phillips tells me that the Maoris called it *Tuatini* and used its teeth to make a saw-like instrument (*Ripi* or *Mira Tuatina*) for cutting human flesh.

Family *HETERODONTIDÆ*.Genus *HETERODONTUS*, Blainville, 1816.**HETERODONTUS PORTUSJACKSONI** (Meyer).

(Plate XXVII, fig. A.)

Squalus portus jacksoni, Meyer, Zool. Entdeck. 1793, p. 71, Based on the Port Jackson Shark figured in Phillip's *Voyage*, p. 166, pl. 42.

Squalus jacksoni Suckow, Naturges. iv, 1799, p. 102 (*fide* Sherborn, Index Animalium). *Id.* Turton, Syst. Nat. (Linné), 1806, p. 922.

Squalus philippi Bloch and Schneider, Syst. Ichth. 1801, p. 134. "New Holland." Based on Phillip.

Squalus philippinus Shaw, Gen. Zool. v, 2, Pisc. 1804, p. 341. Latinization of "Squale philipp" of Lacépède. Botany Bay.

Squalus jacksonii Bullock, Companion Bullock's Mus. ed. 8, 1810, p. 60. "This is a new species, lately discovered in the harbour of Port Jackson, Botany Bay." Figured in the 1814 edition (Compan. London Mus. ed. 17, 1814, p. 90, pl.—, figs. 1-2.)

Acanthias philippi Eichwald, De Selachis, 1819, p. 67. *Ex.* Bloch and Schneider.

Cestracion heterodontus Sherrard. Illustr. Offic. Handbk. Aquar. &c., Melbourne, circa 1896, pp. 42 and 88, figs. . Hobson's Bay, Victoria.

Heterodontus philippi Ogilby. Mem. Qld. Mus. v, 1916, p. 82. Emended orthography.

The synonyms of the Common Port Jackson Shark are here tabulated for the first time. The earliest specific name appeared in Meyer's *Systematisch-Summarische Uebersicht der neuesten Zoologischen Entdeckungen in Neuholland*

und Afrika, where Phillips' illustration of "Lieut. Watts' shark" was also named *Squalus Wattsii*, but the latter name is a synonym of *Orectolobus maculatus* (Bonnaterre).

Genus *MOLOCHOPHRYS* Whitley, 1931.

MOLOCHOPHRYS GALEATUS (Gunther).

(Plate XXVII, fig. B.)

Cestracion galeatus Gunther, Cat. Fish. Brit. Mus. viii, 1870, p. 416. "Australia" (Dr. G. Bennett), probably from near Sydney, N. S. Wales.

Molochophrys galeatus Whitley, Austr. Zool. vi, 1931, p. 310.

The Crested Port Jackson Shark is here figured from a specimen trawled by the "Endeavour" in 35-40 fathoms off Sandon Bluff, New South Wales. In comparison, there is shown the common species (*Heterodontus portusjacksoni*), from a specimen caught at Manly, New South Wales. These beautiful illustrations were drawn by the late A. R. McCulloch, and indicate the differences between the two better than any previously published descriptions or figures.

Family *HEMISCYLLIIDÆ*.

Genus *BRACHÆLURUS* Ogilby, 1907.

BRACHÆLURUS WADDI (Bloch and Schneider).

Squalus waddi Bloch and Schneider, Syst. Ichth. 1801, p. 130, "New Holland" (Latham).

The *Squalus waddi* of Bloch and Schneider was briefly described:—

"*Squalus* corpore superius bruno, nigro fasciato, ventre flavicante, capite depresso, obtusiusculo, cirrhis nasalibus 2, dorso unipinnato, pinna remota, caudali longa, cauda longitudine ceteri corporis.

"Habitat circa novam Hollandiam, *Waddi* appellatus.

"Picturam Dr. Latham communicavit."

The type painting was evidently prepared from a specimen collected near Sydney, New South Wales, by Dr. Latham, and the description most nearly applies to the "Blind Shark," which was later called *Chiloscyllium modestum* by Gunther and *C. furvum* by Ramsay.

I may note here that Dr. Latham, who was a famous ornithologist, described our Saw Shark (*Pristiophorus cirratus*) in the Trans. Linn. Soc. London (ii, 1794, p. 281, pl. xxvi, fig. 5 and pl. xxvii) from Port Jackson. This species was named *Squalus anisodon* by Laéépède (Hist. Nat. Poiss. iv, 1802, p. 680), and *S. tentaculatus* by Shaw (Gen. Zool. v, 2, 1804, p. 359.)

Family *ORECTOLOBIDÆ*.

Genus *STEGOSTOMA* Muller and Henle, 1837.

STEGOSTOMA TIGRINUM (Pennant).

Squalus tigrinus Pennant, Ind. Zool. 1769, p. 24. India.

Squalus maculatus Bloch and Schneider, Syst. Ichth. 1801, p. 130. "Habitat in oceano orientali." Preoccupied by *S. maculatus* Bonnaterre, Tabl. Encycl. Meth. (Ichth). 1788, p. 8, which is the Australian Wobbegong (*Orectolobus*).

Stegostoma varium Garman, Mem. Mus. Comp. Zool. Harvard xxxvi, 1913, p. 59. Ex. "*Squalus varius*" Seba 1761, non. binom. East Indies, etc.

Stegostoma tigrinum McCulloch, Austr. Mus. Mem. v, 1929, p. 7 (synonymy). "Zebra Shark" Welsby, Sport and Pastime in Moreton Bay, 1931, p. 35. Rous Channel, Queensland.

There is a small skin in the Museum at Perth from Wyndham (West Australian Mus. regd. no. P. 1065). New record for Western Australia.

A fine specimen from Moreton Bay occupies a case in the Queensland Museum. A living example, evidently a straggler, was recently captured in Botany Bay, New South Wales, and kept in captivity.

The preoccupied name *Squalus maculatus* may now be added to the synonymy of this species.

Family GINGLYMOSTOMATIDÆ.

Genus NEBRODES Garman, 1913.

Nebrius Ruppell, Neue Wirbelth. Abyssin. Fische, 1837, p. 62. Haplotype, *N. concolor*, Ruppell. Preoccupied by *Nebria* Latreille, Sonnini's Buffon., Ins. iii, 1802, p. 89, a genus of Coleoptera, as noted by Müller and Henle (Plagiost. 1838, p. 22), under *Ginglymostoma*.

Nebrodes Garman, Mem. Mus. Comp. Zool. Harvard xxxvi, 1913, pp. 43 and 56. Logotype, *N. concolor* (Ruppell).

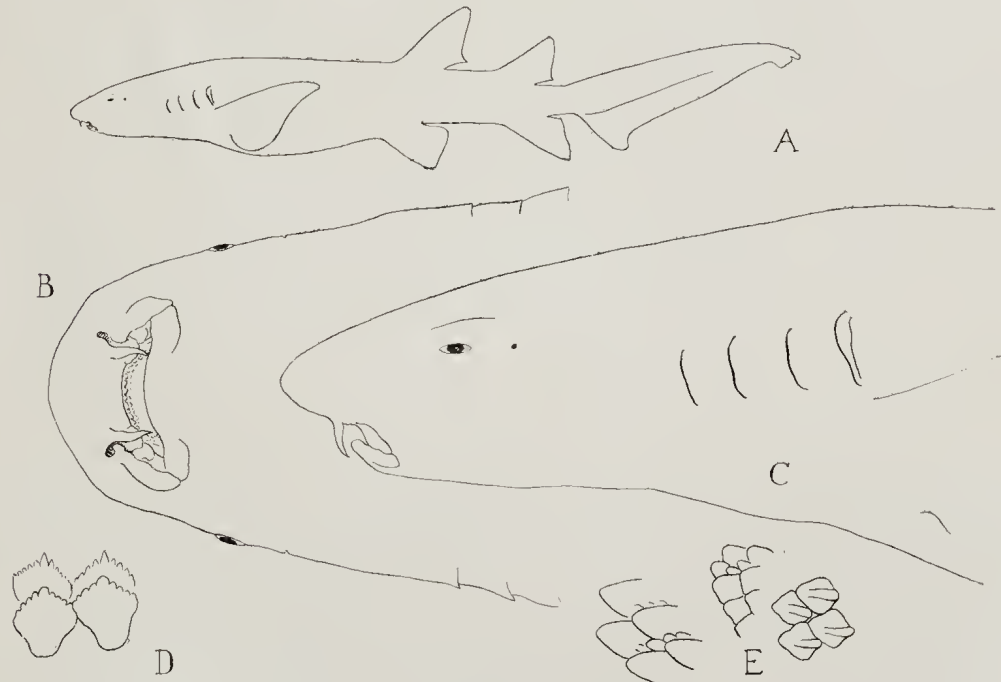
NEBRODES CONCOLOR OGILBYI, subsp. nov.

(Text-figure 1.)

Nebrius concolor Ruppell, Neue Wirbelth. Abyssin. Fische, 1837, p. 62, pl. xvii, fig. 2. Massowah, Red Sea. Not *Nebria concolor* Dejean, Catal. Coleopt., 1821, p. 7, a *nomen nudum* in Coleoptera (*vide* Sherborn).

Ginglymostoma concolor Macleay, Proc. Linn. Soc. N. S. Wales, vii, April 1883, p. 597, Port Moresby, New Guinea.

Nebrius concolor Ogilby, Mem. Qld. Mus. ii, 1913, p. 90, *et ibid* iii, 1915, p. 130; v 1916, p. 75 (Darnley I., Queensland).



(Text-figure 1.)

Nebrodes concolor ogilbyi Whitley.—Holotype of subspecies from Darnley Island, Queensland. Qld. Mus. regd. no. I 1216.—A, entire specimen, B ventral view of head, C lateral view of head, D teeth showing worn functional series, E various forms of dermal denticles. Gilbert Whitley del.

A large specimen of "*Nebrius concolor*," 955 mm. or a little over 3 feet long, from Darnley Island (Qld. Mus. regd. no. I 1216) resembles Ruppell's figure but has a longer snout, longer paired fins, and slight differences in dentition, nasal cirri, etc., wherefore, I give a figure of the Australian specimen, with a subspecific name in honour of the late James Douglas Ogilby, in appreciation of his "Check List" in these Memoirs (1916).

Family *CARCHARHINUS*.

Genus *CARCHARHINUS* Blainville, 1816, *sensu novo*.

Carcharhinus Blainville, Bull. Sci. Soc. Philom. Paris (Aug. 1816), p. 121; Journ. Physique, lxxxiii, 1816, p. 264 (*fide* Sherborn, Index Anim.). Logotype, *Squalus carcharias* Linné, designated by Bosc, Nouv. Dict. Hist. Nat. v, 1816, p. 277.

There has always been some confusion as to the correct application of the etymologically similar generic names *Carcharias*, *Carcharhinus*, *Carcharodon*, etc.

The generic name *Carcharias* was proposed by Rafinesque in 1810. I have not seen his original description, but Jordan and Evermann (Bull. U. S. Nat. Mus. xlvii, i, 1896, p. 33) show that *C. taurus* Raf. is the genotype, and this selection has been confirmed by the International Commission. Thus *Carcharias* is available for the Grey Nurse sharks.

Carcharhinus was the name given by Blainville to some fourteen species of sharks in 1816. Most authors have accepted *C. commersonii* Blainville as the genotype, but I find that Bosc (Nouv. Dict. Hist. Nat. v, 1816, p. 277) designated *Squalus carcharias* Linné as the type. Unfortunately, Blainville's works are not available to me, but it is now obvious that if he mentioned Linné's species in 1816, the Great White Shark *Squalus carcharias*, and not the Grey Shark, *Carcharhinus commersonii*, will be the genotype of *Carcharhinus*. This will cause *Carcharhinus* to be utilised for the White Shark usually known as *Carcharodon*. The name *Carcharorhinus* of Agassiz, 1846, being an emendation for *Carcharhinus* must also be transferred to the synonymy of the White Shark. The name was also spelt *Carcharinus* by Bory de St. Vincent (Dict. Class. iii, 1823, p. 203).

Carcharodon was proposed by Müller and Henle (Mag. Nat. Hist. (Charlesworth), new ser. ii, Jan. 1, 1838, p. 37), who quoted it from A. Smith's manuscripts. The haplotype is *C. capensis*, figured in Smith's Ill. Zool. S. Africa (iii, 1839, pl. iv.). This is a White Shark, generally regarded as a synonym of *Squalus carcharias* Linné (= *Carcharhinus carcharias*, according to the present showing).

Cuvier (Règne Anim. ii, Dec. 1816, p. 125) brought in *Carcharias* for *Squalus carcharias*, but his name is invalidated by Rafinesque's earlier use for the *taurus* type.

This problem has also been discussed by Fowler (Proc. Acad. Nat. Sci. Philad., 1908, p. 62), who has access to Blainville's paper, but was unaware of Bose's genotype designation. Fowler notes that *Carcharhinus commersonii* cannot be the type of *Carcharhinus* Blainville as it is a *nomen nudum*. The next of Blainville's names, *C. lamia* (Raf.) is a synonym of *Squalus carcharias* Linné, and this, Fowler considered, would be the type "which would upset *Carcharodon* of Smith, in which case I shall consider the *Squalus vulpes* Gmelin the type of *Carcharhinus* Blainville."

This would make *Carcharhinus* a synonym of *Alopias*, the Thresher Shark. However, Bose's selection of a genotype antedates Fowler's, and the interpretation of *Carcharhinus* I have given above appears to be the correct one.

Family GALEIDÆ.

The genera of Grey Sharks have been listed in Jordan's "Classification of Fishes," 1923, p. 100, and only a few additions are to be noted, as follows:—

Galeolamna Owen, Deser. Cat. Osteol. R. Coll. Surg. i, 1853, p. 96, no. 427. Haplotype, *G. greyi*, Owen, from South Australia. *Id.* Whitley, Rec. Austr. Mus. xviii, 1932, p. 324. At present indeterminate.

Hemistriakis Herre, Philippine Journ. Sci. xxiii, 1, 1923, p. 71. Orthotype, *H. leucoperiptera* Herre, from Dumaguete, Philippines.

Rhizoprionodon Whitley, Austr. Zool. v, 1929, p. 354. Orthotype, *Carcharias* (*Scoliodon*) *erenidens* Klunzinger. Substitute for *Rhizoprion* Ogilby, preocc.

Negogaleus Whitley, Austr. Zool. vi, 1931, p. 334. Orthotype *Hemigaleus microstoma*, Bleeker. Substitute for *Hemigaleus* Bleeker, preocc.

Notogaleus Whitley, Austr. Zool. vi, 1931, p. 310. Orthotype, *Galeus australis* Macleay.

The genera of Galeidæ may be conveniently divided into subfamilies, although *Scylliogaleus* deserves family rank. I would restrict *Galeus* and its allies to the Galeinæ and separate other subfamilies as Galeocerdinæ and Loxodontinæ. Then the genera allied to the *Carcharhinus* of authors (not of Blainville, s. str.) would enter the subfamily Scoliodontinæ, and it is to this group that the Queensland Grey Sharks belong. The identification of the genera is assisted by the keys given by Gill (Ann. Lyceum Nat. Hist. N. York vii, 1862, p. 399–400) and Ogilby (Mem. Qld. Mus. v, 1916, pp. 90–95).

The "*Carcharhinus*" of Ogilby is no longer valid and requires subdivision, wherefore I propose *Mapolamia*, gen. nov. for *C. melanopterus* Quoy and Gaimard, and *Gillisqualus* gen. nov. for the Queensland Shark identified by Ogilby as *Carcharhinus amblyrhynchos* Bleeker. I have considered our Whaler Sharks as perhaps belonging to the genus *Galeolamna* of Owen, but more detailed research has convinced me that the status of Owen's name is at present indeterminate, so I provide *Galeolamnoides* gen. nov. for *Carcharias macrurus* Ramsay and Ogilby, the Whaler Shark of New South Wales.

Subfamily SCOLIODONTINÆ.

Genus SCOLIODON Müller and Henle, 1837.

Scoliodon Müller and Henle, Ber. Verh. K. Pr. Akad. Wiss. Berlin 1836 (1837), p. 114; Arch. Naturgesch. (Wiegmann) iii, 1, 1837, p. 397; Mag. Nat. Hist. (Charlesw.) ii, 1838, p. 35. Logotype, *Carcharias laticaudus* Müller and Henle. *Id.* Ogilby, Mem. Qld. Mus. i, 1912, p. 27.

SCOLIODON JORDANI Ogilby.

(Text-figures 2 and 3).

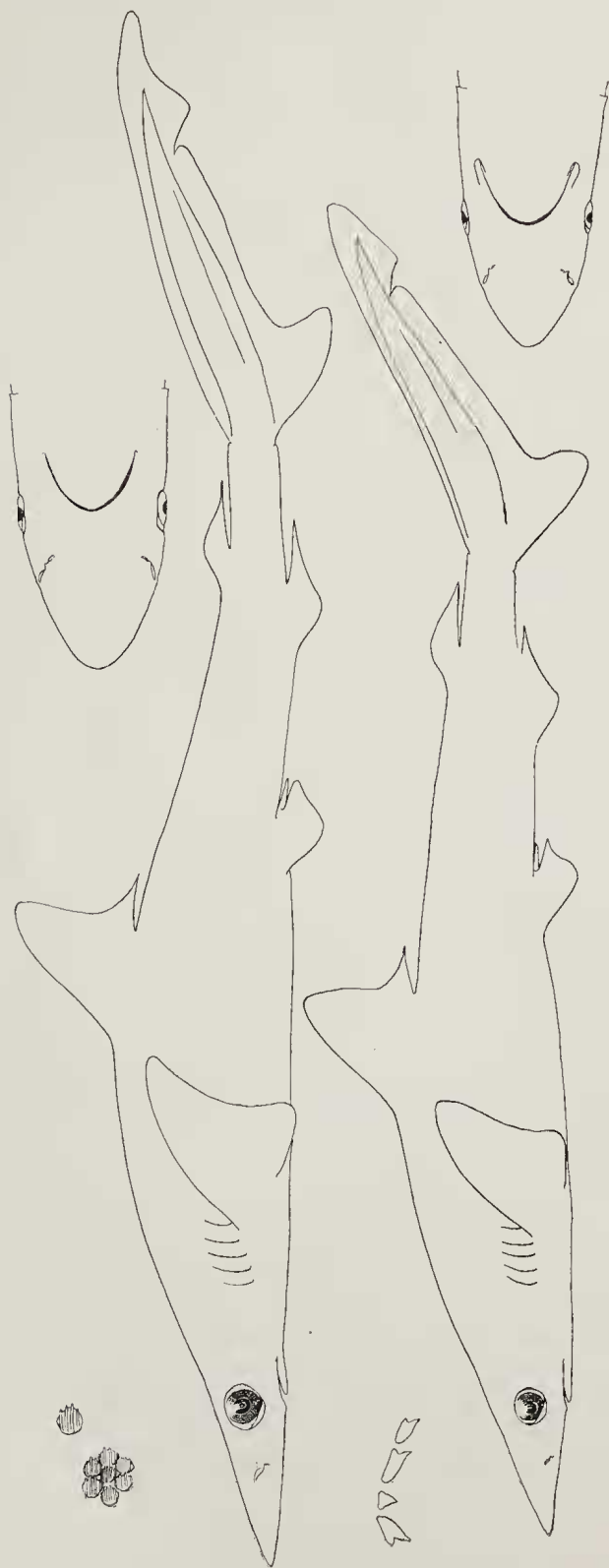
- Carcharias acutus* Ogilby, Cat. Fish. Austr. Mus. i, Palæichth., July 1888, p. 1, and Proc. Linn. Soc. N. S. Wales (2) iii, 1889, p. 1766. Burnett River, Queensland. Specimen in Austr. Mus. seen. Not *C. acutus* Rüppell, Neue Wirbelth., Fische, 1837, p. 65, pl. xviii, fig. 4, from the Red Sea.
- Scoliodon jordani* Ogilby, Ann. Rept. Amat. Fish. Assoc. Qld. 1906-7 (July 1907), p. 12. *Nom. nud.* *Id.* Ogilby, Proc. Roy. Soc. Qld. xxi, 1908, p. 88. Outer Caloundra Bank, South Queensland; 25 fathoms. Type lost.
- Scoliodon affinis* Ogilby, Mem. Qld. Mus. i, Nov. 27, 1912, p. 29, *et. ibid* v, 1916, pp. 79 and 94. Noosa Head, Queensland. Holotype (No. I. 1526) in Queensland Museum examined.
- Scoliodon longmani* Ogilby Mem. Qld. Mus. i, Nov. 27, 1912, p. 30 *et. ibid* v, 1916, pp. 80 and 94. Moreton Bay, Queensland. Holotype (No. I. 292) in Queensland Museum examined.

The type-specimen of *Scoliodon jordani* cannot now be found in the Queensland Museum, the "Endeavour" collections, or the Australian Museum, though the jaws may be preserved amongst those in the Amateur Fisherman's Association of Queensland's collection, though not labelled as such. Ogilby noted that he was present at the time this shark was captured so undoubtedly described it, with other fishes, aboard the "Endeavour," and did not retain the type.

The nominal species *affinis* and *longmani* have been fully described by Ogilby, but I do not regard the differences in the shape of the dorsal fin and the extent of the labial folds as sufficiently characteristic to distinguish more than one species. However, I now offer the first illustrations of the type-specimens so that other workers may judge for themselves.

The jaws and teeth have been removed from the type of *affinis* and the corners of the mouth have been cut away so that it is now impossible to distinguish the upper labial fold which Ogilby described as "very short and directed outwards at a right angle to the jaw."

As for the type of *longmani*, the specimen is curved and somewhat hardened so that it is difficult to represent it in side view. Measurements taken on one side of the specimen do not coincide with those taken on the other and thus may be explained any slight discrepancies between my figure and the original description by Ogilby. In any case, the pectoral fins of *longmani* do not reach "to below middle of first dorsal,"



(Text-figures 2 and 3.)

Scoliodon jordanii Ogilby. Upper figure, holotype of *Scoliodon affinis* Ogilby. Lower figure, holotype of *Scoliodon longmani* Ogilby.
Denticles and teeth drawn from the *longmani* specimen. * Southern Queensland. Gilbert Whitley del.

In the Australian Museum there is still preserved the foot-long specimen (Regd. No. B. 7028) recorded by Ogilby from the Burnett River, where Henry Smithurst obtained it in 1885. It has short labial folds, apparently intermediate in form between those of *affinis* and *longmani* and approaches the latter form in having the dorsal fin longer than high. A slightly larger female from Moreton Bay is also preserved in the Australian Museum (regd. no. I. 12621).

An ascarid parasite from a Townsville *Scoliodon* has been described by Baylis (Ann. Mag. Nat. Hist. (10) viii, 1931, p. 95 and figs.).

MAPOLAMIA, gen. nov.

Orthotype, *Carcharias melanopterus* Quoy and Gaimard.

Small sharks, rarely more than five feet in length, common inshore in tropical Pacific waters and easily recognised by the contrasted black tips to the fins. The genus may be defined as follows:—

General form of *Eulamia* but with the head broad and depressed and not more than one-fourth of the total length. Vent slightly nearer snout than tip of tail. Eye small, its longitudinal diameter greater than its vertical diameter; a well developed nictitating membrane. Snout rounded. Nostrils large, nearer eye than tip of snout, and with triangular flaps. Fifth gillslit smallest and situated over pectoral base. Labial folds very small. Teeth triangular, serrated, broader in upper jaw than in lower, in one or two functional series, those of the upper jaw notched and serrated. Tongue broadly rounded.

Body tapering. Caudal peduncle compressed, and with a slight dip above and below. Scales minute, forming rough shagreen.

First dorsal large, opposite the interspace between the paired fins. Second dorsal well developed, and opposite anal. Pectorals falciform. Ventrals opposite the long interdorsal space. Upper lobe of caudal fin notched. All the fins conspicuously bordered with black.

Generic definition drawn up from a male specimen, 21 inches long, from the Ellice Islands, Oceania. Austr. Mus. Regd. No. 1A-5523.

This genus is typified by the *Carcharias melanopterus* of Quoy and Gaimard (Voy. Uranic, Zool, 1824, p. 194, pl. xliii, figs. 1-2. Waigiou). These authors included the *Squalus carcharias minor* of Forskal and *Squalus ustus*, Dumeril as synonyms, but these are a distinct species, *ustus* Blainville 1816. *Squalus malapterus* Lesson (Dict. Class. Hist. Nat. v, 1829, p. 596), is the same as Quoy and Gaimard's name, which is probably again a synonym or sub-species of *Squalus spallanzani* Lesueur (Journ. Acad. Philad. ii, Nov. 1822, p.

351. Terre de Witt, New Holland) from North Western Australia. Thus the Black-tip Shark of the Queensland and Northern Australian coasts, ranging also to New Guinea and Oceania, should now be called *Mapolamia spallanzani* (Lesueur). The occurrence of *melanopterus* in Victoria was noted by McCoy (Ann. Mag. Nat. Hist. (3) xx, 1867, p. 183, Hobson's Bay, 15 feet!) but this is more likely to refer to a Whaler Shark (*Galeolamnoides macrurus* = ? *Galeolamna greyi*). Again, the Hawaiian form called *melanopterus* may represent a new subspecies, as it appears to differ from the type in the shape of the head, especially about the nostrils and mouth, and, to a less extent, in the relative position of its fins.

GILLISQUALUS gen. nov.

Orthotype, *G. amblyrhynchoides*, sp. nov.

Teeth compressed, erect, serrated in upper jaw and minutely serrated in lower jaw, the points not markedly deflected outwards. Spiracles obsolete. First dorsal originating over posterior part of pectoral base. General characters as described for the species. Differs from *Hypoprionodon* Gill 1862 mainly in having the teeth of the upper jaw serrated.

Named in honour of Theodore Gill, the great American ichthyologist whose taxonomic work on sharks and fishes resulted in a tremendous advance in the knowledge of their classification and nomenclature.

GILLISQUALUS AMBLYRHYNCHOIDES sp. nov.

(Text Figure 4.)

Carcharinus amblyrhynchos Ogilby, Mem. Qld. Mus. iii, 1915, p. 132, Cape Bowling Green.
Carcharinus amblyrhynchos Ogilby, Mem. Qld. Mus. v, 9, 6, pp. 81 and 94, Cape Bowling Green, Coast of North Queensland. Not *Carcharias (Prionodon) amblyrhynchos* Bleeker, Nat. Tijdschr. Ned. Ind. x, 1856, p. 467. Near Solombo, Java Sea.

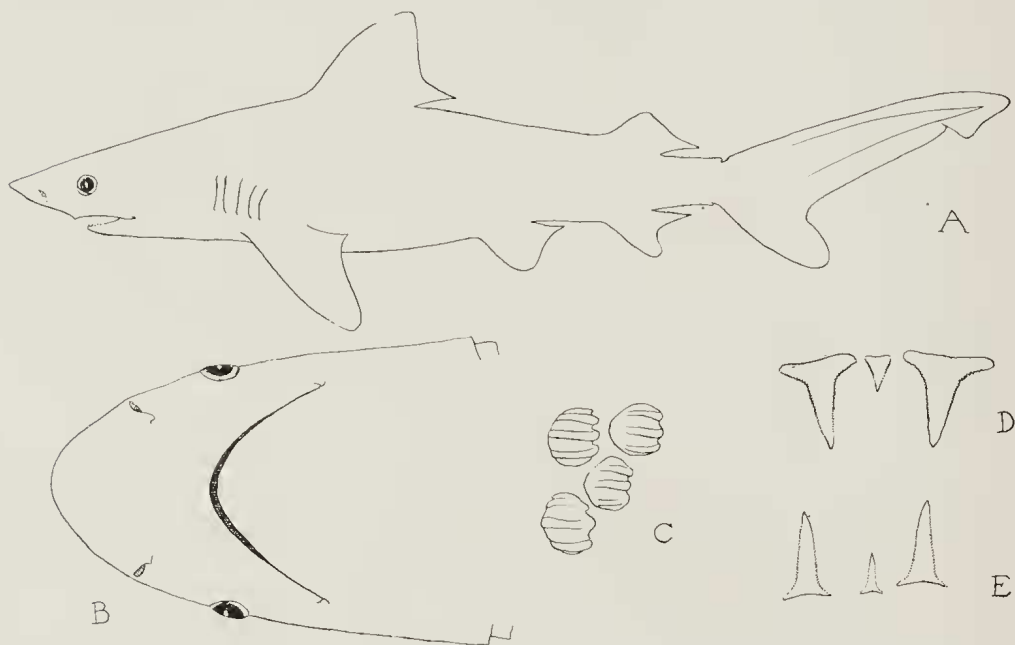
C. amblyrhynchos was described by Bleeker, and Duméril added further details from Bleeker's manuscript but the species was unknown to Günther and to Garman and has apparently never been figured. Ogilby identified as *C. amblyrhynchos* the shark from Cape Bowling Green described below, but it does not agree with the typical description.

Head, measured to fifth gill opening (145 mm.) about one-quarter of the total length (about 600 mm.) Anterior margin of vent midway between snout and tip of tail. Head broader than high and longer than broad. Snout 38 mm. between parallels. Eye 13 mm. deep and 10 long. Interorbital 68, eye to first gill opening 69, internarial space 37, preoral length 45, gill openings 24/25/26/23/18, depth of body about 90.

Snout to first dorsal 185 mm; first dorsal base 70; first dorsal, height about 67; interdorsal space 113; second dorsal base 28, its height 18.5, caudal peduncle 39 or 34 behind anal fin. Lower caudal lobe (61) 2.7 in upper

lobe (165). Anal base 39, its height 27. Length of pectoral 95, but tips have been damaged.

Snout acutely rounded. Nostrils nearer eye than end of snout, the tips of the valves forming right angles and the width of the nostril equals the longitudinal diameter of the eye. Distance between nostrils about five-sixths of preoral length. The eye lies over the anterior part of mouth; pupil vertical and of lenticular form; nictitating membrane present. No spiracle. Last two gill openings closer together than others and overlying pectoral fin. Two lines of pores between eye and mouth and groups of pores on other parts of head. Mouth more than twice as wide as it is long (width 63 mm. and length of arc of lower jaw 35). A very small labial fold in upper jaw.



(Text-figure 4.)

Gillisqualus amblyrhynchoides Whitley.

Ogilby's specimen of "*Carcharhinus amblyrhynchos*" (*non* Blkr.), from Cape Bowling Green, Queensland. Q. M. regd. no. I 2003—*A* Lateral view of entire specimen, *B* ventral view of head, *C* dermal denticles, *D* teeth of upper jaw, near symphysis, *E* teeth of lower jaw, near symphysis. Gilbert Whitley *del.*

Dental formula $\frac{13. 1. 13}{11. 1. 11} = \frac{27}{23}$ Median teeth small, others long and

acutely pointed and with broad cusps; teeth noticeably serrated in upper jaw and minutely serrated in lower; two functional series, erect.

Habit gracefully fusiform, the body broadest just before the gills. Caudal peduncle rounded with a large superior and a smaller inferior lunate pit. Scales extremely minute,

First dorsal originating over posterior part of pectoral base. Pectorals rather short, and with rounded extremities, but they have evidently been damaged and the tips regenerated. In any case, they would not be nearly as long as the head and their length is about $1\frac{1}{2}$ times their width. Length of anterior margin of pectoral, from base to tip, less than distance between eye and last gill-opening; the adpressed fin does not quite reach the vertical of posterior angle of dorsal base (Ogilby says it reaches to below anterior third of first dorsal, but this is incorrect). Ventrals below interdorsal space. Second dorsal and anal almost opposite, the anal origin being almost imperceptibly posterior; the fins subequal. Upper caudal lobe notched.

Coloration in formalin, dull plumbeous, darkest on dorsal surface and on fins.

Described and figured from Ogilby's specimen of "*Carcharhinus amblyrhynchos*," the holotype of my new species, a female nearly two feet long.

Locality.—Cape Bowling Green, Queensland. Qld. Mus. Regd. No. I. 2003.

It differs notably from the descriptions of Bleeker's type in having much shorter pectorals and in having the first dorsal base longer than the height of that fin, and in having the snout acutely pointed rather than almost semi-circular. The proportions and coloration are different and the new species has triearinate dermal denticles. There are minor discrepancies as well which induce me to separate the present form as a new species.

GALEOLAMNOIDES, gen. nov.

Orthotype, *Carcharias macrurus* Ramsay and Ogilby = *Galeolamnoides macrurus*.

Upper teeth triangular, very oblique laterally, and serrated on both edges; their outer edges are more or less notched, the angle being very much greater in those on the sides than near the symphysis. Lower teeth narrow, erect, and more or less obscurely serrated. Snout rather long and rounded. Spiracles obsolete.

Dorsal fin entirely behind vertical of pectoral base. A detailed description and figure of the typical form has been given by McCulloch (Proc. Linn. Soc. N. S. Wales, xvi, 4, 1921, p. 457, pl. xxxvii, figs. 1-4).

GALEOLAMNOIDES STEVENSI (Ogilby).

Carcharhinus stevensi Ogilby, Ann. Qld. Mus. x, Nov. 1911, p. 37, and as *Carcharias* on p. 38. Bustard Bay and Nor-West Islet, Qld.

Carcharhinus stevensi Ogilby, Mem. Qld. Mus. v, 1916, pp. 80 and 94 (the Check List referred to below). *Id.* McCulloch, Austr. Zool. i, 7, 1919, p. 220. *Id.* Coppleson, Med. Journ. Austr. April 15, 1933, p. 458.

The late A. R. McCulloch made a sketch of a mounted specimen, in the Queensland Museum, which he tentatively identified as this species. In his card-index, he made the following MS. notes:—

"It is labelled as *C. spenceri* Ogil. from Moreton Bay, on the authority of Ogilby, but it cannot be that species according to his key in his Queensland Check-list, as the length from the vent to the end of the tail is much less than that from the vent to the tip of the snout. I regard it as *C. stevensi*, Ogil., but it differs from the description of that species in having the anal inserted behind the vertical of the middle of the second dorsal. The types of *C. stevensi* cannot be found in the Queensland Museum; they were first described as 164-187 mm. long but in the check-list these measurements are said to be centimetres. No other specimen appears to be preserved in Qld. Mus. which can be referred to either *spenceri* or *stevensi*.

"Compared with *melanopterus* and *amblyrhyncho[ide]s*, this specimen presents the following characters:—Length from middle of vent to tip of tail equal to distance from vent to about half-way between first gill opening and eye. Eye small, longer than deep, its horizontal diameter much less than its distance from the nostril, and about half the width of the widest gill opening. Length of anterior margin of pectoral fin from base to tip equal to the interspace between the eye and the posterior gill-opening. Preoral length equal to about $\frac{3}{4}$ width of mouth; snout broadly rounded. Darker above, light below; fins apparently uniform.

"This specimen agrees with Waite's figure of *C. brachyurus* (Rec. Austr. Mus. vi, pl. 39), and I believe them to represent the same species, whatever it may prove to be."

To the present writer this specimen appears to represent a northern form of the Whaler Shark. The teeth are small, those from middle of side of upper jaw serrated and somewhat notched.

Family SPHYRNIDÆ.

Genus SPHYRNA Rafinesque, 1810.

SPHYRNA LEWINI (Griffith).

(Plate XXVIII.)

Zygæna lewini Griffith, Animal Kingdom (Cuvier) x, 1834, p. 640, pl. L. "Off the south coast of New Holland," i.e., Sydney, New South Wales. Also spelt *Z. lewisii* by Bleeker, 1854, and *Z. leeuwini* by Günther, 1870.

Sphyrna zygaena Studer, Zool. Forsch. Gazelle iii, 1889, p. 263 (Moreton Bay, Queensland).

Sphyrna tudes Ogilby, Ann. Qld. Mus. ix, Oct. 1908, p. 4. Moreton Bay, Queensland, and Tweed Heads, New South Wales. *Id.* Borodin, Bull. Vanderbilt Mus. i, 1932, p. 69 (Southport, Queensland). Not *S. tudes* Müller and Henle, Syst. Plagiost. ii, 1839, p. 53 = *Zygæna tudes* Valenciennes, Mem. Mus. Hist. Nat. Paris ix, July 1823, p. 225, from Mediterranean, Cayenne, and Coromandel.

Cestracion tudes Ogilby, Mem. Qld. Mus. v, 1916, pp. 82 and 94 (South Queensland locs.).

Head (130 mm.) 4.4 in total length (580). Vent nearer tip of snout than that of tail. Head wider than long, the breadth of the "hammer" being 165 mm. Eye 14 mm. Interorbital 157 (below) to 160 (above the head).

Gill openings 15/20/20/19/13 mm. Preoral length 41, width of mouth 39, length of arc 22. Depth of body about 65 mm. Snout to first dorsal 170. First dorsal base 59, its height 80. Interdorsal 127. Second dorsal base 20, its height 11. Caudal peduncle 40. Upper caudal lobe rather more than 3 times length of lower. Pectoral fin 71. Anal base 29. Anal-caudal interspace 36.

Form elongate and tapering, the body broadest and deepest near first dorsal fin, if the lateral expansions of the head be excluded. Head hammer-shaped, the cephalic extensions sloping slightly backwards and the anterior margin of the head with five concave sinuations. Eye large with round pupil and nictitating membrane. Slit of nostril subequal to eye, valve small; an anterior groove runs a short distance along each side of the profile of the head. Numerous sensory canals and pores on head. First and second gill opening more separated than the others; the fifth is above the pectoral. Mouth almost semicircular, labial folds obsolescent. The teeth are erect, with their acute points directed outwards and number about 20 to 25 in each jaw; one series in function and median teeth smallest.

Lateral line conspicuous; a large lunate pit above and a smaller one below the caudal peduncle. Scales exceedingly minute, forming a satiny shagreen.

First dorsal elevated, arising behind vertical of pectoral base. Second dorsal originating over the first third of the anal whose base is one and a-half times as long as that of the second dorsal. Pectorals short and somewhat rounded. Ventrals small. Lower caudal lobe rounded; upper notched below. Caudal fin about one-third of length without hammer.

General colour, in formalin, brownish, lighter below. The margins of the fins with peacock blue and greyish iridescence.

Described and figured from the specimen recorded by Ogilby as *S. tudes*, a female, 23 inches long.

Locality.—Moreton Bay, Queensland. Qld. Mus. Regd. No. I. 740.

Distinguished from *Platysqualus* (Valenciennes) by the arrangement of the sensory organs and pores on the head³ and by general details of proportion, shape, etc.

A mask modelled after a Hammerhead Shark has been figured from Jervis Is., Torres Strait, by Meyer (K. Ethnogr. Mus. Dresden vii, 1889, pl. iii), and a shrine to this remarkable shark is mentioned in Frazer's Golden Bough (v, 1919, footnote 1 on page 139) from Torres Strait also.

³Lloyd and Sheppard, Proc. Zool. Soc. (London), 1922, iv, pp. 971-981, figs. 1-7, give an account of the anatomy of the head of a hammerhead shark.

Family SQUALIDÆ.

Genus SQUALUS Linné, 1758.

The Australian Dogfishes are perhaps not strictly congeneric with *Squalus acanthias* Linné, the genotype of *Squalus* selected by Jordan and Gilbert (Bull. U. S. Nat. Mus. iii, 16, 1882, p. 16). Synonyms of this genus have the same genotype and are: *Squallus* Seopoli, 1777; *Acanthorhinus* Blainville, 1816; *Acanthias* Eichwald, 1819; and *Carcharias* Gistel, 1848, preoccupied.

SQUALUS MEGALOPS (Macleay).

(Plate XXVII, fig. C.)

Acanthias megalops Macleay, Proc. Linn. Soc. N. S. Wales vi, 2, Sept. 12, 1881, p. 367. Port Jackson.

My friend, Mr. W. J. Phillipps, recently supplied a brief review of the Piked Dogfishes of New Zealand and Australia (N. Z. Journ. Sci. Tech. xii, 6, 1931, pp. 360-361), in connection with which it is of interest to reproduce the accompanying drawing by the late A. R. McCulloch of a Victorian example of *Squalus megalops*, 404 mm. long. Austr. Mus. regd. no. I. 10826.

FAMILY ISURIDÆ.

Genus ISUOPSIS Gill, 1862.

ISUOPSIS MAKO (Whitley).

Isurus mako Whitley, Rec. Austr. Mus. xvii, 1929, p. 101, New Zealand.

This is the Mako shark of the New Zealand fishermen and the Blue Pointer of Australia. I have examined specimens in the Museums of Sydney, Adelaide, and Wellington, and freshly caught examples.

Making allowance for shrinkage in preserved specimens, the Australian form seems more slender than the South African, *I. bideni* (Phillipps), and has a shorter snout; height of dorsal about $\frac{1}{4}$ head, slightly more than $\frac{1}{2}$ depth of body. A three-foot mounted specimen (Austr. Mus. regd. no. I. 2756) of the Blue Pointer from Manly, New South Wales, has depth 7 in total length. Eye 3 in snout. Distance from anterior border of eye to that of nostril 4 in distance from posterior margin of eye to first gill slit. Interocular width (67) longer than length of snout from level of anterior margins of eyes (81). Internarial space (46) 1.2 in distance from nostril to end of snout (58).

Lower caudal lobe (126) 1.24 in upper (157). Caudal peduncle not nearly twice as wide as deep. Depth of body more than 5 in length without caudal in mounted specimen. Second dorsal entirely in advance of anal.

Another specimen of *Isuopsis mako* from Rosa Gully, South Head, Port Jackson (a young male caught 15/10/30 on line over a sandy bottom) had the following characters:—

Dental formula $\frac{13 + 13}{13 + 13}$. Teeth in two functional series.

Total length 43 inches; depth $7\frac{1}{2}$ inches; head to last gill opening 14; head to first gill opening $10\frac{1}{2}$; eye 1 in.; snout $2\frac{5}{8}$; snout from level of anterior eye margins $3\frac{1}{4}$; snout from nostril $2\frac{1}{2}$; mouth $4\frac{1}{2}$; ant. teeth, lower jaw, $\frac{1}{2}$; ant. border of nostril to that of eye, $1\frac{5}{16}$; internarial space, $1\frac{3}{4}$; post. margin of eye to first gill slit, 6; interocular, $2\frac{3}{4}$; pectoral length $6\frac{3}{4}$; pectoral base $3\frac{1}{2}$; pectoral, inner length from middle of base, $7\frac{3}{4}$; first dorsal, height $3\frac{1}{2}$; first dorsal, base $3\frac{1}{2}$; termination of first dorsal to origin of second dorsal $12\frac{1}{4}$; second dorsal entirely in advance of anal. Origin of anal to that of ventral 8; ventral base 2. Clasper $1\frac{3}{4}$; axilla of pectoral to origin of ventral $12\frac{1}{2}$; axilla of pectoral to vertical of dorsal $7\frac{1}{2}$; upper caudal lobe 8; lower caudal lobe $6\frac{1}{2}$; width of caudal peduncle, including keel, 3; depth half-way between second dorsal and caudal about $1\frac{3}{4}$. Nostril above anterior border of jaw, when lip is retracted. Dorsal nearer pectoral than ventral but behind pectoral base. Precaudal pits above and below. Spiracle a minute black spot well behind eye. Weight $18\frac{1}{2}$ lb.

General colour very dark navy blue above, changing to dull greyish after death. Ventral surface whitish. Eye very dark grey. Shagreen rough, satiny. Five very wide gill slits, before the pectorals; the last two approximate and crowded by insertion of pectoral fin.

A head of a New South Wales specimen, preserved in spirit, has eye (22.5 mm.) 3.6 in snout (83).

$$\text{Dental formula } \frac{10 + 11}{10 + 10} = \frac{21}{20}.$$

Interocular width (64) 1.1 in length of snout from vertical of anterior margins of eyes (75). Internarial space (38) 1.5 in distance from nostril to end of snout (58). The snout in this specimen is much more acute than in others, a sexual character, according to Phillipps.

As regards the South Australian form, Mr. Herbert M. Hale has kindly supplied the following information (*in lit.*, 4/3/30):—

"The cast of the Blue Pointer illustrated by Waite in his Fish list and Handbook is not in this Museum, and I think it is in the Canterbury Museum. Fishermen state that the species is common in our waters but I have seen very few specimens. We have a cast of a small example; it is impossible to furnish accurate details of the dentition, but I have made the following measurements, all in mm.

Snout to mid-caudal region	..	..	..	1,300
Snout to ant. border of eye	..	..	..	110
Snout to level of ant. borders of eyes	..	..	..	100
Snout to first gill-slit	..	..	..	300
Interorbital space	..	..	..	90
Distance between nostrils	..	..	..	50

The nostrils are 10 mm. in advance, and 10 mm. above the level, of the anterior border of the mouth. The spiracle is apparently absent or minute. The specimen was caught by H. Kemp, in Moonta Bay, Spencer Gulf, South Australia."

Family HALSYDRIDÆ.

Genus HALSYDRUS Fleming, 1809.

(Plate XXIX: Figures 1-3.)

- Halsydrus* Fleming, Scots Mag. 1809, p. 7; Brewster's Edinb. Encycl. xi, 1817, p. 713, and Philos. Zool. ii, 1822, p. 380. Haplotype, *Halsydrus pontoppidiani* Fleming. Based on the "Sea Serpent" of Stronsay, Orkney Islands, which was later identified as a Basking Shark.
- Tetroras* Rafinesque, Carat. Ale. N. Gen. Spec. Sicil., April 1, 1810, p. 11. Haplotype, *T. angiora* Rafinesque (*vide* Jordan, Gen. Fish. i, 1917, p. 77).
- Tetnoras* Rafinesque, Analyse Nat. 1815, p. 93, *Nom. nud.* (*vide* Sherborn).
- Cetorhinus* Blainville, Bull. Sci. Soc. Philom. Paris, Aug. 1816, p. 121 (*vide* Sherborn). Haplotype *C. gunneri* Blainville = *Squalus maximus* Gunner = Linné (*vide* Jordan, Gen. Fish. i, 1917, p. 95).
- Selache* Cuvier, Règne Anim. ed. 1, ii, "1817" = Dec. 1816, p. 129. Haplotype, *Squalus maximus* Blainville = Linné. *Id.* Schinz, Das Thierreich (Cuvier) 1822, p. 220. *Id.* Cuvier, Règne Anim. ed. 2, ii, 1829, p. 396. *Id.* Lesson, Dict. Class. Hist. Nat. v, 1829, p. 597.
- Selanche* Jarocki, Zoologia, iv, 1822, p. 452 (*vide* Sherborn).
- Selachus* Minding, Lehrb. Naturg. Fische 1832, p. 52 (*vide* Sherborn). *Id.* Yarrell, Hist. Brit. Fish. ii, 1836, p. 296. *Id.* Pavesi, Ann. Mus. Civ. Stor. Nat. Genova xii, 1878, p. 416. Emend. pro. *Selache* Cuvier.
- Ceteorhinus* Agassiz, Nomencl. Zool. 1846, Index. Univ. p. 75. Emendation for "*Ceterhinus*" Blainville, 1816. Type, *Squalus maximus* Linné, by present designation.
- Polyprosopus* Couch, Hist. Fish. Brit. Is. i, 1862, p. 67. Logotype, *Squalus rashleighanus* Couch, selected by Jordan and Evermann, 1896, *Id.* Gill, Proc. Acad. Nat. Sci. Philad. 1864, p. 207.
- ? *Hannorera* Van Beneden, Bull. Acad. Roy. Belg., xxxi. 1871, p. 504. Orthotype, *H. aurata* Van Beneden (*vide* Jordan, Gen. Fish. iii, 1919, p. 360). *Id.* Smith Woodward, Cat. Foss. Fish. Brit. Mus. i, 1889, p. 429. Fossil Shark.

I have not seen Rafinesque's original description of *Tetroras*, but Jordan and Evermann, in 1896, note it as stating "Two dorsals; one anal; four gill openings; tail unequal, oblique; snout blunt; teeth rasp-like; a keel on each side of tail; eyes very small; gill openings rather large; length about 6 feet. Called *Angiora* at Palermo." They regard it as applicable to *Cetorhinus* but suggest that it may be a mélange of *Isurus* and *Heptranchias*, the latter now being called *Anciora* at Palermo. The rasp-like teeth and blunt snout, however, preclude *Isurus* and one hesitates to make scientific identifications on the treacherous basis of vernacular names, especially as *Heptranchias* has seven gill slits and the basking shark has only five, the last of which is sometimes overlooked by casual observers, hence the name *Tetroras*.

The earliest name for this genus appears to be *Halsydrus* Fleming, based on the famous "Sea-serpent" of the Orkney Is. which was later shown to be a basking Shark, *H. maximus* (Linné).

This large selachian was first recorded from Australia by McCoy, whose specimen I have seen in the Exhibition Building, Melbourne, besides a half-grown example from Williamstown, Victoria, in the National Museum, Melbourne. The South Australian Museum, Adelaide, has several specimens, including a magnificent cast of a very large example. The Australian Museum, Sydney, has the gill rakers of Waite's specimen from southern New South Wales and the teeth of another from Mungo Beach, near the Myall Lakes, New South Wales. Photographs of the latter specimen are here reproduced as this constitutes the most northerly Australasian record. The tail of this shark was about one-fifth of the total length which was 25 feet.

Our Basking Shark ranges from New South Wales southward to Tasmania and New Zealand and westward to the Great Australian Bight. Mr. W. J. Phillipps has kindly supplied the following Neozelanic localities:—near mouth of Wade River, Davenport; Whangaparaoa Peninsula ("every spring"); Kapiti Island, Wairoa, Makara, and off Wellington, New Zealand.

If the Australasian form prove distinct from the European, the name *Halsydrus maccoyi* is available for it (Barrett, Sun Nature Book iv, "Water Life," 1933, p. 13 *ex Tetroras maccoyi* Whitley and Phillipps M.S.).

LIST OF AUSTRALIAN SPECIES.

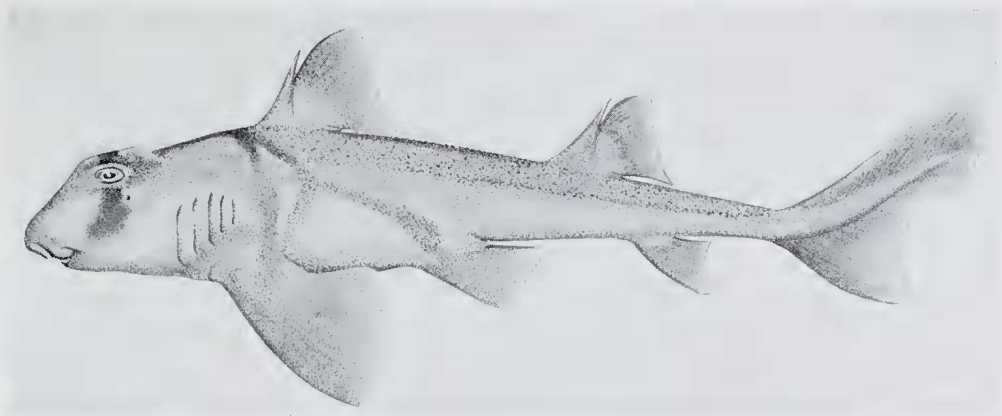
In conclusion, I offer the following list of the Sharks of Australia and New Zealand, with an indication, whenever known, of their size, breeding methods, and harmfulness or otherwise, to man. The distribution of the species will in most cases be found in McCulloch's "Check-List" and Phillipps' "Bibliography."

1. One-finned Shark, *Heptranchias dakini* Whitley. Length about three feet.
2. Seven-gilled Shark, *Notorynchus cepedianus* (Péron). Over 9½ feet. Regarded as harmful to man in South Australia (Waite), but not looked upon as dangerous in New Zealand (Phillipps).
3. Port Jackson Shark, *Heterodontus portusjacksoni* (Meyer). 4 feet. Oviparous; egg case without tendrils. Harmless.
4. Crested Port Jackson Shark, *Molochophrys galeatus* (Günther). About 4 feet. Oviparous; egg case with tendrils. Harmless.
5. Northern Catshark, *Hemiscyllium freycineti* (Quoy and Gaimard). About one foot. Oviparous. Harmless.
6. Epaulette Shark, *Hemiscyllium ocellatum* (Bonnaterre). Over 3 feet. Oviparous. Harmless.
7. Speckled Catshark, *Hemiscyllium trispeculare* (Richardson). Two feet. Oviparous. Harmless.
8. Brown-banded or spotted Catshark, *Chiloscyllium punctatum* (Müller and Henle). Over 2 feet. Oviparous. Harmless.
9. Collared Catshark, *Parascyllium collare* Ramsay and Ogilby. Nearly 3 feet. Oviparous. Harmless.
10. Rusty Catshark, *Parascyllium ferrugineum* McCulloch. 2½ feet. Probably oviparous. Harmless.

11. Southern Catshark, *Parascyllium variolatum* (Duméril). Three feet. Probably oviparous. Harmless.
12. Blind Shark, *Brachaelurus waddi* (Bloch and Schneider). About 3 feet. Ovo-viviparous (Waite, Rec. Austr. Mus. iv, 1901, p. 32, pl. iv).
13. Carpet Shark, *Orectolobus ornatus* (De Vis). Six or seven feet. Ovo-viviparous. May attack a wader or, when caught, may snap at a man.
14. Wobbegong, *Orectolobus maculatus* (Bonnaterre). Five to six feet. Similar to *O. ornatus*.
15. Ogilby's Wobbegong, *Orectolobus ogilbyi* Regan. Four feet. Probably like *O. ornatus* and *maculatus*.
16. Cobbler Shark, *Orectolobus tentaculatus* (Peters). Three feet. Feared by children in West Australia, but probably harmless.
17. Zebra Shark, *Stegostoma tigrinum* (Pennant). Six feet (or nine, according to Ogilby). Oviparous. Harmless.
18. Tawny Shark, *Nebrodes concolor ogilbyi* Whitley. Over 3 feet. Oviparous? Harmless.
19. Blue-grey Shark, *Heteroscyllium colcloughi* (Ogilby). Only known from the type, 1½ feet long. Harmless.
20. Black-spotted Catshark, *Aulohalaelurus labiosus* (Waite). Only known from the type, about 2 feet long. Doubtless oviparous. Harmless.
21. Spotted Catshark, *Scyliorhinus analis* (Ogilby). Over 2 feet. Oviparous. Harmless.
22. Gulf Catshark, *Scyliorhinus vincenti* (Zietz). Two feet. Oviparous. Harmless.
23. Sawtail Shark, *Figaro boardmani* Whitley. Two feet. Doubtless oviparous. Harmless.
24. Draughtboard Shark, *Cephaloscyllium isabella* (Bonnaterre). About 1 foot. Oviparous. Harmless.
25. Swell Shark, *Cephaloscyllium laticeps* (Dumeril). About 1 foot. Oviparous. Harmless.
26. Marbled Catshark, *Atelomycterus marmoratus* (Raffles). About 2 feet. Oviparous. Harmless.
27. Black Tip Shark, *Mapolamia spallanzani* (Lesueur). Rarely more than 5 feet, but Ogilby records 10 feet for "*Carcharhinus melanopterus*." Probably viviparous, and harmless.
28. Shark, *Galeolamna greyi*, Owen. Only known from jaws in the Royal College of Surgeons.
29. Graceful Shark, *Gillissqualus amblyrhynchoides* Whitley. About 2 feet; only known from type.
30. Ganges Shark, *Platypodon gangeticus* (Müller and Henle). Nine feet. Viviparous. Dangerous to bathers.
31. Grey Shark, *Platypodon menisorrh* (Müller and Henle). Over 5 feet. Viviparous. Not regarded as dangerous.
32. Whaler, or Cocktail, *Galeolamnoides macrurus* (Ramsay and Ogilby). Twelve feet. Viviparous. Known to attack man.
33. New Zealand Whaler, *Galeolamnoides brachyurus* Gunther. About 8 feet. Probably viviparous and dangerous.
34. Northern Whaler, *Galeolamnoides stevensi* (Ogilby). About 6 feet. Probably viviparous and potentially harmful. Type missing.
35. Estuary Shark, *Galeolamnoides spenceri* (Ogilby). Over 6 feet. Viviparous and probably dangerous. Type not traced.
36. Great Blue Shark, *Prionace glauca* (Linné). Twenty feet. Viviparous. May be dangerous.
37. Long-nosed Shark, *Hypoprion hemiodon* (Müller and Henle). No data. About 2½ feet.
38. Maclot's Shark, *Hypoprion macloti* (Müller and Henle). At least 3 feet; no data as to breeding, etc.

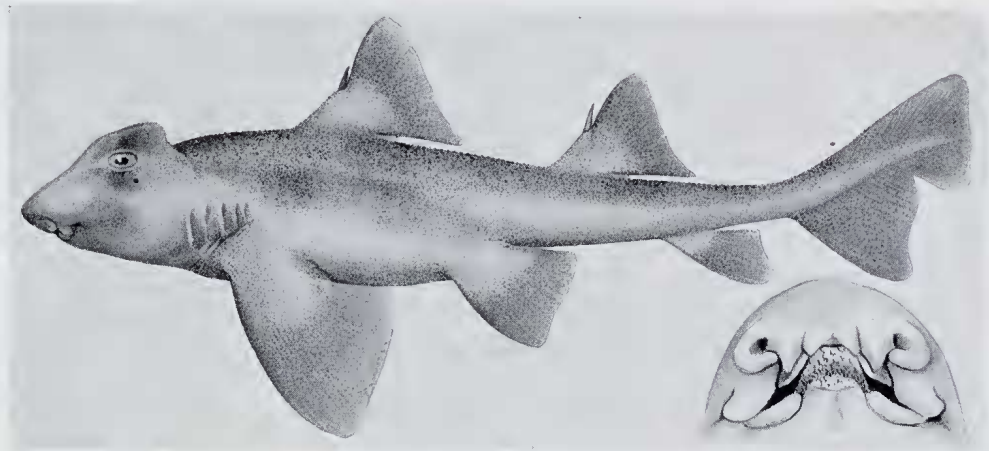
39. Jordan's Blue Dog Shark, *Scoliodon jordani* Ogilby. Type, nearly 3 feet long, lost. For synonymy, vide *supra*, in this paper.
40. Sharp-toothed Shark, *Aprionodon acutidens* (Rüppell). Over 6 feet.
41. Tiger Shark, *Galeocerdo rayneri* Macdonald and Barron. Over 16 feet. Viviparous. Known to attack man.
42. Northwestern Tiger Shark, *Galeocerdo curvier* (Lesueur). Probably like *G. rayneri*. See Journ. Acad. Nat. Sci. Philad. ii, Nov. 1822, p. 351, apparently a tiger shark.
43. Little Nurse, *Triakis scyllium* Müller and Henle. Two and a-half feet. Harmless.
44. School Shark, *Notogaleus australis* (Macleay). At least 6 feet. Viviparous. Not known to attack man.
45. Gummy or Sweet William, *Mustelus antarcticus* Gunther. Three and a-half feet. Ovo-viviparous, with a structure like a placenta. Harmless.
46. New Zealand Gummy, *Mustelus lenticularis* Phillipps. Probably like *M. antarcticus*.
47. Little Blue Shark, *Rhizoprionodon crenulens* (Klunzinger). Four feet. Harmless.
48. Muller's Shark, *Physodon mulleri* (Müller and Henle). No data.
49. Taylor's Shark, *Physodon taylori* (Ogilby). Type over 2 feet long, now missing.
50. Hammerhead Shark, *Eusphyra blochii* (Cuvier). Over five feet, probably much larger. Viviparous and perhaps dangerous.
51. Lewin's Hammerhead, *Sphyrna lewini* (Griffith). Ten feet. Probably viviparous. Harmless, so far as is known.
52. Large Hammerhead, *Sphyrna zygaena* Linné. Length over 15 feet or well over 400 lb. weight. Viviparous. Regarded as likely to attack man.
53. Mackerel Shark, *Lamna nasus* (Bonnaterre). Ten feet. Dangerous.
54. Mako or Blue Pointer, *Isuropsis mako* (Whitley). Twelve feet or nearly 800 lb. weight. Very savage and dangerous.
55. White Shark or White Pointer, *Carcharhinus carcharias* (Linné). Said to grow to more than 40 feet. A New Zealand specimen, 12½ feet long, weighed 910 lb. Dangerous.
56. Grey Nurse, *Carcharias arenarius* Ogilby. Fifteen feet; an 8-foot specimen weighed 370 lb. Viviparous. Dangerous to bathers.
57. Blue Nurse, *Carcharias tricuspidatus* Day. At least 12 feet. Probably viviparous and dangerous.
58. Thresher, or Fox Shark, *Alopias caudatus* Phillipps. Sixteen feet and over 900 lb. weight. Not regarded as harmful to man.
59. Goblin Shark, *Mitsukurina owstoni* Jordan. Length 7 feet.
60. Basking Shark, *Halsydrus maximus* (Linné). Over 35 feet. Harmless.
61. White-spotted Dogfish, *Squalus kirki* (Phillipps). Three feet. Harmless, but all the dogfishes may cause wounds by means of their dorsal spines.
62. Piked Dogfish, *Squalus megalops* (Macleay). Less than 3 feet. Ovo-viviparous; the spines of the embryo protected by knobs before birth.
63. Victorian Dogfish, *Squalus whitleyi*, Phillipps. Probably like the preceding species.
64. Dogfish, *Entoxychirus uyatus* (Rafinesque). The record of this species from Australia may be referable to a *Squalus*.
65. Prickly Dogfish, *Oxynotus brunicensis* (Ogilby). Two feet. Harmless.
66. Plunket's Shark, *Proscymnodon plunketi* (Waite). Four feet. Viviparous. Harmless.
67. Thompson's Deepsea Dogfish, *Centrophorus kaikouræ*, nom. nov. pro. *C. calceus* Thompson (Rec. Canterb. Mus. iii, 4, 1930, p. 275, pl. xlii, figs. a-i), not of Lowe. Nearly 4 feet. The species of *Centrophorus* are harmless deepsea sharks and of the breeding habits in Australia or New Zealand little is known, though all are probably viviparous.

68. Nilson's Deepsea Dogfish, *Centrophorus nilsoni* Thompson. Three and a-half feet.
 69. Waite's Deepsea Dogfish, *Centrophorus waitei* Thompson. About 1 foot long.
 70. Deep-sea Dogfish, *Centrophorus harrissoni* McCulloch. Nearly 3 feet.
 71. Endeavour Dogfish, *Centrophorus scalpratus* McCulloch. Three feet.
 72. Long-snouted Dogfish, *Deaniops quadrispinosus* (McCulloch). Four feet. Probably viviparous. Harmless.
 73. Black Shark, *Scymnorhinus phillippsi* Whitley. Four feet. Viviparous (*see* Parker, Trans. N. Z. Inst. xv, 1882 (1883), pp. 222-234, pls. xxxi-xxxii). Harmless.
 74. Bramble Shark, *Echinorhinus (Rubusqualus) mccoysi* Whitley. Over 7 feet. Harmless.
 75. Luminous Shark, *Leius ferox* Kner. Type about 7 in. long, but grows larger. Harmless.
 76. Leiche, *Euprotomicrus bispinatus* (Quoy and Gaimard). Small and harmless. Recorded from New Zealand by Hutton on the basis of jaws which have since been lost (Phillipps).
 77. Sherwood's Shark, *Scymnodon sherwoodi* Archey. About 3 feet. Harmless.
 78. Frill-gilled Shark, *Chlamydoselachus* sp. Only known from Stead's identification of some decomposed remains from Port Jackson which do not appear to have been preserved.
 79. Angel Shark, *Squatina australis* Regan. Five feet. Viviparous. Harmless.
 80. Ornate Angel Shark, *Squatina tergocellata* McCulloch. About 1½ feet. Probably viviparous. Harmless. The New South Wales form belongs to a new subspecies.
 81. Saw Shark, *Pristiophorus cirratus* (Latham). Four feet. Viviparous, the rostral teeth of the embryo lie flat against the sides of the snout before birth. Harmless.
 82. Southern Saw Shark, *Pristiophorus nudipinnis* Gunther. Four feet, very similar to *P. cirratus*.
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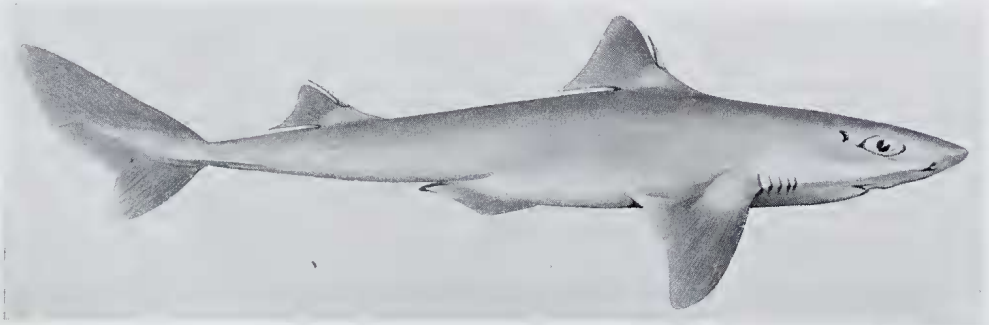
Heterodontus portusjacksoni (Meyer). A specimen, 550 mm. long, from Manly, New South Wales.
Austr. Mus. regd. no. I 9307.

[Drawing by Allan R. McCulloch.]



Molochophrys galeatus (Gunther). A specimen trawled off Sandon Bluff, New South Wales.
"Endeavour" Collection, no. E. 1760.

[Drawing by Allan R. McCulloch.]

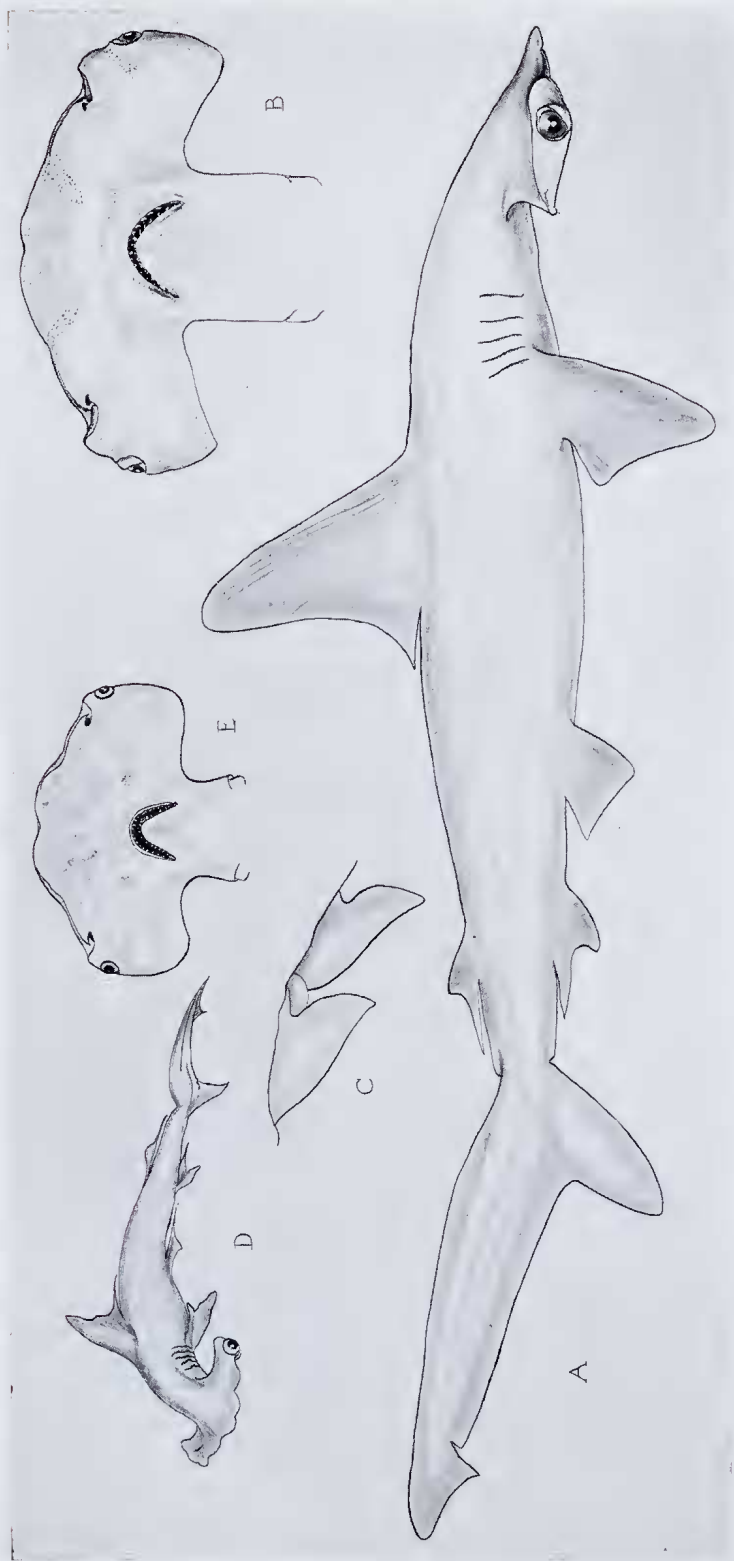


Squalus megalops Macleay. A specimen, 404 mm. long, from the coast of Victoria.

Austr. Mus. regd. no. I. 10826 (ex "Endeavour" coll.).

Face page 200.

[Drawing by Allan R. McCulloch.]



Sphyrna lewini (Griffith).

A.—Ogilby's specimen of "*Sphyrna tudes*" from Moroton Bay, Queensland. Qld. Mus. regd. no. I. 740.

B. Ventral surface of head of same specimen.

C. Teeth of same.

D. Type of *lewini* (after Griffith).

E. Type of *tudes* (after Valenciennes).

Joyce K. Allan del.]



Figs. 1. and 2. *Halysdrus maximus* (Linné). A specimen, 25 feet long, washed up at Mungo Beach, New South Wales, in September 1930.

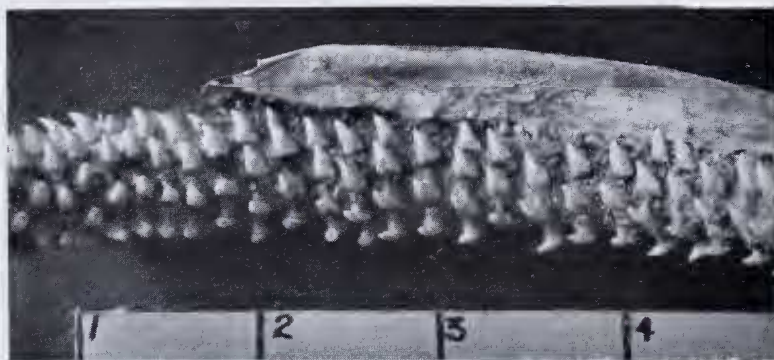


Fig. 3. *Halysdrus maximus* (Linné). Some of the teeth of the same specimen with inch-rule for comparison.
Photographs: A. L. Marshall, Bullahdelah, N.S.W.